



UNITED STATES PATENT AND TRADEMARK OFFICE

len
UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/534,883	05/13/2005	Kia Silverbrook	MJT011USNP	8702
24011 7590 03/27/2007 SILVERBROOK RESEARCH PTY LTD 393 DARLING STREET BALMAIN, 2041 AUSTRALIA			EXAMINER STEPHENS, JUANITA DIONNE	
			ART UNIT 2853	PAPER NUMBER
SHORTENED STATUTORY PERIOD OF RESPONSE		MAIL DATE	DELIVERY MODE	
3 MONTHS		03/27/2007	PAPER	

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary

Application No.

10/534,883

Applicant(s)

SILVERBROOK, KIA

Examiner

Juanita D. Stephens

Art Unit

2853

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on Application filed 5/13/2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-51 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-51 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 13 May 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>3/11/07, 11/13/06, 5/13/05</u> | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Information Disclosure Statement

1. Acknowledgement is made of the Information Disclosure Statement(s) filed 3/11/2007, 11/13/2006 and 5/13/2005.

Specification

2. The disclosure is objected to because of the following informalities:

The "CROSS-REFERENCE TO RELATED APPLICATIONS" section is missing.

Appropriate correction is required.

Claim Objections

3. Claims 8, 9, 12, 20, 26, 27, and 43 are objected to because of the following informalities:

In claim 8, line 3 delete "a".

In claim 9, line 3 delete "a".

In claim 9, line 4 delete "the" (3rd occurrence).

In claim 9, lines 1 and 4 replace "ejectable liquid" with --bubble forming liquid--.

In claim 12, line 3 replace "a bubble" with --said bubble.

In claim 26, line 3 delete "a".

In claim 27, line 4 delete "a" (1st occurrence).

In claim 27, line 5 delete "the" (2nd occurrence).

In claim 27, lines 2 and 5 replace "ejectable liquid" with --bubble forming liquid--.

In claims 43, lines 2 and 5 replace "ejectable liquid" with --bubble forming liquid--.

Art Unit: 2853

In claim 20, line 1 replace "the ejectable liquid" with --an ejectable liquid--.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. Claims 1-2, 9, 18-20, 27, 36-37, and 43 are rejected under 35 U.S.C. 102(e) as being anticipated by Pidwerbecki (US 6,293,654 B1).

Pidwerbecki discloses a method of ejecting a drop of an ejectable liquid from a printhead and a printer system incorporating said printhead (Fig. 1), comprising: **1)** a plurality of nozzles (28), **2)** at least one heater element (resistor 13) corresponding to each nozzle, wherein each heater element is in thermal contact with a bubble forming liquid (col 2, lns 55-56), **3)** each heater element has a mass of 10 nanograms of solid material and is heated a temperature above its boiling point to form a gas bubble therein thereby to cause the ejection of a drop of the bubble forming liquid through the nozzle corresponding to that heater element (col 3, lns 49-65), **4)** configured to support the bubble forming liquid in thermal contact with each said heater element, and to support the bubble forming liquid adjacent each nozzle (as shown in Fig. 1), **5)** configured to receive a supply of the ejectable liquid at an ambient temperature, wherein each heater

Art Unit: 2853

element is configured such that the energy required to be applied thereto to heat said part to cause the ejection of said drop is less than the energy required to heat a volume of said ejectable liquid equal to the volume of said drop, from a temperature equal to said ambient temperature to said boiling point (col 3, lns 49-51), and 6) wherein the bubble forming liquid (ink) and the ejectable liquid (ink) are of common body of liquid (common to inkjet printheads utilizing heaters). Pidwerbecki further at least teaches that its teaching are applicable to other inkjet printers (col 4, lns 31-33)

The method of claims 36-37 and 43 are disclosed is Pidwerbecki as discussed above with respect to the apparatus.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 3, 8, 12-14, 21, 26, 30-32, 42, and 46-48 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pidwerbecki (US 6,293,654 B1) in view of Silverbrook (US 6,019,457).

Pidwerbecki discloses a method of ejecting a drop of an ejectable liquid from a printhead and a printer system incorporating said printhead (Fig. 1), comprising: **1)** a plurality of nozzles (28), **2)** at least one heater element (resistor 13) corresponding to each nozzle, wherein each heater element is in thermal contact with a bubble forming liquid (col 2, lns 55-56), **3)** each heater element has a mass of 10 nanograms of solid

Art Unit: 2853

material and is heated a temperature above its boiling point to form a gas bubble therein thereby to cause the ejection of a drop of the bubble forming liquid through the nozzle corresponding to that heater element (col 3, Ins 49-65), **4)** configured to support the bubble forming liquid in thermal contact with each said heater element, and to support the bubble forming liquid adjacent each nozzle (as shown in Fig. 1), **5)** configured to receive a supply of the ejectable liquid at an ambient temperature, wherein each heater element is configured such that the energy required to be applied thereto to heat said part to cause the ejection of said drop is less than the energy required to heat a volume of said ejectable liquid equal to the volume of said drop, from a temperature equal to said ambient temperature to said boiling point (col 3, Ins 49-51), and **6)** wherein the bubble forming liquid (ink) and the ejectable liquid (ink) are of common body of liquid (common to inkjet printheads utilizing heaters). Pidwerbecki further at least teaches that its teaching are applicable to other inkjet printer (col 4, Ins 31-33)

Pidwerbecki does not disclose **1)** a page-width printhead, **2)** wherein each heater has an actuation energy of less than 500 nanojoules (nJ), **3)** wherein the bubble which each heater element is configured to form is collapsible and has a point of collapse, and wherein each heater element is configured such that the point of collapse of a bubble formed thereby is spaced from the heater element, **4)** a structure that is formed by chemical vapor deposition (CVD), said nozzles being incorporated in the structure, **5)** structure which is less than 10 microns thick, said nozzles being incorporated in the structure. Silverbrook at least teaches a page-width printhead (col 2, Ins 19-20), wherein each heater (120) has an actuation energy of less than 500 nanojoules (nJ) (col

Art Unit: 2853

19, Ins 8-10), wherein the bubble which each heater element is configured to form is collapsible and has a point of collapse, and wherein each heater element is configured such that the point of collapse of a bubble formed thereby is spaced from the heater element (as shown by the shape of the heater element 120 in Fig. 10-12), a structure (overcoat 142) that is formed by chemical vapor deposition (CVD) said nozzles being incorporated in the structure (col 8, Ins 65-66), and a structure which is less than 10 microns thick, said nozzles being incorporated in the structure (col 9, Ins 8-10). It would have been obvious at the time the invention was made to a person having ordinary skill in the inkjet art to modify Pidwerbecki with the structure as taught to be old by Silverbrook for the purpose of providing mechanical strength to resist the shock of exploding or collapsing vapor bubbles and providing protection against the external environment.

The method of claims 42, and 46-48 are disclosed in Pidwerbecki in view of Silverbrook as discussed above with respect to the apparatus.

8. Claims 4-6, 22-24 and 38-40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pidwerbecki (US 6,293,654 B1) in view of Yamashita et al. (US 5,969,005)

Pidwerbecki teaches the claimed invention, with the exception of **1)** said mass if less than 2 nanograms, **2)** said mass is less than 500 picograms, and **3)** said mass is less than 250 picograms. Yamashita et al. at least teaches that the ink is jetted at an output of from 1 to 70 nanograms per droplet to effect recording (abstract, col 30, Ins 29-32, Ins 38-40; col 31, Ins 18-22). It would have been obvious at the time the

Art Unit: 2853

invention was made to a person having ordinary skill in the ink jet art to modify Pidwerbecki with the output of 1 to 70 nanograms per droplet to effect recording as taught to be old by Yamashita et al. for the purpose of providing a greater surface area of the droplet, thus strongly improving image quality.

The method of claim 38-40 are disclosed in Pidwerbecki in view of Yamashita et al. as discussed above with respect to the apparatus.

9. Claims 7, 11, 17, 25, 29, 35, 41, 45, and 51 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pidwerbecki (US 6,293,654 B1) in view of Kubby (US 5,706,041).

Pidwerbecki teaches the claimed invention, with the exception of **1)** heater element is in the form of a suspended beam, that is suspended over at least a portion of a bubble forming liquid so as to be in thermal contact therewith, **2)** wherein each heater element has two opposite sides and is configured such that said gas bubble formed by that heater element is formed at both of said sides of that heater element, and **3)** wherein each heater is substantially covered by a conformal protective coating, such that the coating is seamless. Kubby at least teaches that the heater element is in the form of a suspended beam (18) (col 3, lns 50-53), arranged for being suspended over at least a portion of a bubble forming liquid so as to be in thermal contact therewith, wherein each heater element has two opposite sides and is configured such that said gas bubble formed by that heater element is formed at both of said sides of that heater element (abstract; col 4, lns 47-65; col 5, lns 8-16), and wherein each heater is substantially covered by a conformal protective coating, such that the coating is

Art Unit: 2853

seamless (col 4, lns 11-17). It would have been obvious at the time the invention was made to a person having ordinary skill in the ink jet art to modify Pidwerbecki by providing the heating element as taught to be old by Kubby for the purpose of dissipating heat from the heating element more efficiently, preventing wasted heat from accumulating within the printhead.

The method of claims 41, 45, and 51 are disclosed in Pidwerbecki in view of Kubby as discussed above with respect to the apparatus.

10. Claims 10, 28, and 44 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pidwerbecki (US 6,293,654 B1) in view of Feinn et al. (US 6,543,879 B1).

Pidwerbecki teaches the claimed invention, with the exception of the areal density of the nozzles relative to the substrate surface exceeding 10,00 nozzles per square cm of substrate surface. Feinn et al. discloses the areal density of the nozzles relative to the substrate surface exceeding 10,00 nozzles per square cm of substrate surface (abstract; col 16, lns 11-13). It would have been obvious at the time the invention was made to a person having ordinary skill in the inkjet art to modify Pidwerbecki with the areal density as taught to be old by Feinn et al. for the purpose of improving resolution.

The method of claim 44 is disclosed in Pidwerbecki view of Feinn et al. as discussed above with respect to the apparatus.

11. Claims 15, 33, and 49 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pidwerbecki (US 6,293,654 B1) in view of Komuro (US 4,965,594).

Art Unit: 2853

Pidwerbecki teaches the claimed invention, with the exception of the heater being formed on different layers. Komuro at least teaches an inkjet print head having a heater that is formed in a plurality of different layers (col 3, lns 35-65, as seen in Fig. 1). It would have been obvious at the time the invention was made to a person having ordinary skill in the ink jet art to modify Pidwerbecki by providing a heater that is formed in a plurality of different layers as taught to be old by Komuro for the purpose of enabling drops of different sizes to be ejected in order to produce a graduated recording.

The method of claim 44 are disclosed in Pidwerbecki in view of Komuro as discussed above with respect to the apparatus.

12. Claims 16, 34, and 50 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pidwerbecki (US 6,293,654 B1) in view of The Fabrication of Reliability Testing of Ti/TiN Heaters (DeMoor).

Pidwerbecki teaches the claimed invention, with the exception of each heater element is formed of solid material more than 90% of which, by atomic proportion, is constituted by at least one periodic element having an atomic number below 50. DeMoor at least teaches that it is desirable to use a heater made of Ti/TiN (Ti has an atomic number of 22) in integrated MEMS systems (a thermal inkjet is such a system), because the material provide the advantages of CMOS fabrications (low cost and uniformity) in combination with a very high reliability (see Conclusion). It would have been obvious at the time the invention was made to a person having ordinary skill in the inkjet art to modify Pidwerbecki by providing the Ti/TiN heater as taught to be old by

Art Unit: 2853

DeMoor, for the purpose of providing advantages of CMOS fabrication in combination with high reliability.

The method of claim 50 is disclosed in Pidwerbecki in view of DeMoor as discussed above with respect to the apparatus.

Double Patenting

13. A rejection based on double patenting of the "same invention" type finds its support in the language of 35 U.S.C. 101 which states that "whoever invents or discovers any new and useful process ... may obtain a patent therefor ..." (Emphasis added). Thus, the term "same invention," in this context, means an invention drawn to identical subject matter. See *Miller v. Eagle Mfg. Co.*, 151 U.S. 186 (1894); *In re Ockert*, 245 F.2d 467, 114 USPQ 330 (CCPA 1957); and *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970).

A statutory type (35 U.S.C. 101) double patenting rejection can be overcome by canceling or amending the conflicting claims so they are no longer coextensive in scope. The filing of a terminal disclaimer **cannot** overcome a double patenting rejection based upon 35 U.S.C. 101.

14. Claims 1-19 and 21-51 are rejected under 35 U.S.C. 101 as claiming the same invention as that of claims 1-50 of prior U.S. Patent No. 6,736,489 B1. This is a double patenting rejection.

US Patent No 6,736,489 discloses all of the claimed limitations of claims 1-19 and 21-51 as follows:

Claims 1 of application is the same as claim 1 of patent; Claim 2 of application is the same as claim 2 of patent; Claim 3 of application is the same as claim 3 of patent; Claim 4 of application is the same as claim 4 of patent; Claim 5 of application is the same as claim 5 of patent; Claim 6 of application is the same as claim 6 of patent; Claim 7 of application is the same as claim 7 of patent; Claim 8 of application is the same as claim 8 of patent; Claim 9 of application is the same as claim 9 of patent; Claim 11 of

Art Unit: 2853

application is the same as claim 11 of patent; Claim 12 of application is the same as claim 12 of patent; Claim 13 of application is the same as claim 13 of patent; Claim 14 of application is the same as claim 14 of patent; Claim 15 of application is the same as claim 15 of patent; Claim 16 of application is the same as claim 16 of patent; Claim 17 of application is the same as claim 17 of patent; Claim 18 of application is the same as claim 18 of patent; Claim 19 of application is the same as claim 19 of patent; Claim 21 of application is the same as claim 20 of patent; Claim 22 of application is the same as claim 21 of patent; Claim 23 of application is the same as claim 22 of patent; Claim 24 of application is the same as claim 23 of patent; Claim 25 of application is the same as claim 24 of patent; Claim 26 of application is the same as claim 25 of patent; Claim 27 of application is the same as claim 26 of patent; Claim 28 of application is the same as claim 27 of patent; Claim 29 of application is the same as claim 28 of patent; Claim 30 of application is the same as claim 29 of patent; Claim 31 of application is the same as claim 30 of patent; Claim 32 of application is the same as claim 31 of patent; Claim 33 of application is the same as claim 32 of patent; Claim 34 of application is the same as claim 33 of patent; Claim 35 of application is the same as claim 34 of patent; Claim 36 of application is the same as claim 35 of patent; Claim 37 of application is the same as claim 36 of patent; Claim 38 of application is the same as claim 37 of patent; Claim 39 of application is the same as claim 38 of patent; Claim 40 of application is the same as claim 39 of patent; Claim 41 of application is the same as claim 40 of patent; Claim 42 of application is the same as claim 41 of patent; Claim 43 of application is the same as claim 42 of patent; Claim 44 of application is the same as claim 43 of patent; and Claim

Art Unit: 2853

45 of application is the same as claim 44, Claim 46 of application is the same as claim 45 of patent; Claim 47 of application is the same as claim 46 of patent; Claim 48 of application is the same as claim 47 of patent; Claim 49 of application is the same as claim 48 of patent; Claim 50 of application is the same as claim 49 of patent; and Claim 51 of application is the same as claim 50 of patent.

Contact Information

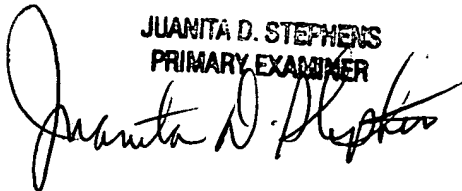
15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Juanita D. Stephens whose telephone number is (571) 272-2153. The examiner can normally be reached on Flex (Monday-Thursday 9:00 am -6:00 pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Meier can be reached on (571) 272-2149. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a

Art Unit: 2853

USPTO Customer Service Representative or access to the automated
information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.


JUANITA D. STEPHENS
PRIMARY EXAMINER

Juanita D. Stephens
Primary Examiner
Art Unit 2853

JDS
March 22, 2007